

THE GOLDENVILLE-HALIFAX BOUNDARY AT FAIRVIEW, N. S.

ELIZABETH KING

Armdale, Nova Scotia.

(Received May 26, 1935).

ABSTRACT

At the boundary between the Goldenville and Halifax formations at Fairview, N. S., there has been found a bed of impure limestone. This is a continuation of the long-known limestone bed on the other limb of the Dartmouth syncline at Preston. Several other beds of limestone below the first have been discovered. At the surface the limestone has been decomposed, leaving a porous rock containing manganese dioxide. The limestone deposits are probably concretionary. Water-worn pebbles were found in the quartzite, but only near the boundary and there sparingly. We make the suggestion that these pebbles were dropped by floating ice in the interval between the deposition of the Goldenville and Halifax sediments.

Two summers ago I found a limestone pebble on Dutch Village Road, and later found another further north on the same road. Probably these pebbles are of glacial origin. Though limestone is found in Hants County, my samples had not travelled far because they were little worn and limestone is comparatively soft. J. W. Goldthwait¹ said that, because of their shortness, trails of the softer rocks do not demand such extensive field studies. Glacial striae in this region show that the glacier came from 30-40° W. E. R. Faribault² reported limestone at Preston and at Southeast Passage. W. Malcolm³ said that limestone has been seen at two points at the base of the Halifax formation. "On the shore at Southeast Passage P. O. it is found in a crystalline state interstratified with quartzite in a belt several feet thick. A bed 3 feet thick is found at the same horizon near Preston Road P. O. and was burned by the early settlers for lime. Almost anywhere east of Halifax, effervescence with acid shows the presence of calcium carbonate in a few beds at the base of the formation."

Though this limestone has not been reported from in or west of Halifax, the above facts led me to explore the boundary. This was found exposed (1) on the property of Mr. A. E.

¹ Goldthwait, *Canada Dept. of Mines, Geol. Survey, Memoir No. 40*, 75 (1924).

² Faribault, *Geol. Survey Map, City of Halifax Sheet*, No. 68.

³ Malcolm, *Canada Dept. of Mines, Geol. Survey, Memoir No. 20*, 53 (1912).

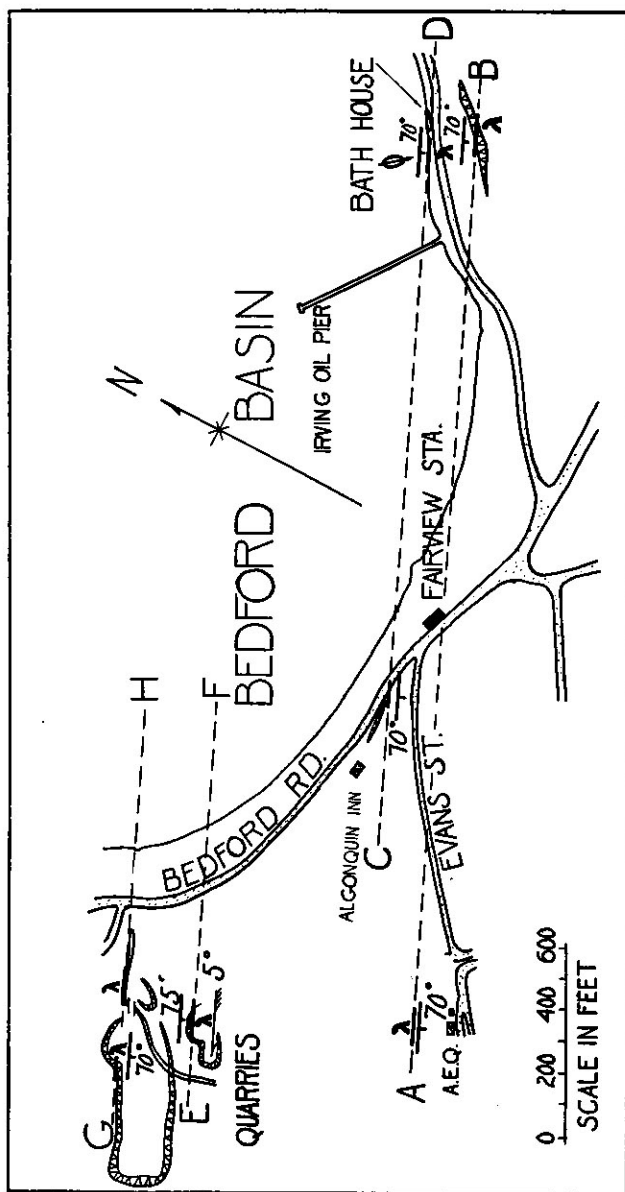


Fig. 1. Map of Fairview Region Showing Boundary and Limestone Beds.

Quaintance on Evans Street Extension, Fairview, (2) to the south of the bathhouse on the property of the Irving Oil Co., Ltd., and (3) at the crossing of Robie and Leeds Streets and to the south of Rockhead Prison. Most of my field work was in the Fairview region which is only about 1.5 miles from home. The boundary crosses the Bedford Basin as shown by line AB on Fig. I., though on the Geological Survey Map, Sheet No. 68, it is 0.1 mile to the south. The Halifax formation near the boundary consists of a uniform slate carboniferous with distinct cleavage. At the boundary there is an abrupt change to a series of alternating beds of quartzite and slate showing prominent cross-bedding.

The area shown on the map is between the Dartmouth syncline on the south and the Birch Cove anticline on the north. The strata dip to the south with an angle of 70-75°. In the southern quarry at E there is a curious cave-like structure out of which flows water. The bedding planes have a dip to the south of 75°. The roof resembles the barrel structure at Waverley and at first sight looks like the top of an anticline. The roof slopes 113° W. with a plunge of 5°.

Throughout this region the granite intrusion must have been very near the surface. In Maxwell's quarry the slate and quartzite have a conchoidal fracture similar to that at known granite contacts to the southwest of Halifax. Quartz veins cut the strata just to the south of Algonquin Inn at right angles to the strike. Near these veins there has been a deposition in the rocks of silica from solution. This is similar to a case found to the northwest of Governor Lake.

Interbedded in these highly metamorphosed sedimentaries are found at least four beds of limestone. These are at points marked λ on the map. Other beds of limestone probably are present. For instance, a bed to the west of Rockhead Prison points to a little north of Algonquin Inn but could not be found there because of glacial drift. Here and there in the quartzite small nodules of limestone are found, which do not seem to belong to any special bed.

The limestone is very impure, appearing similar in color to the surrounding rock. The two southern beds are grayish-black while the two northern ones are pale gray. The limestone rock effervesces freely with hydrochloric acid but does not disintegrate. Directed by Dr. King, I found that the limestone contains ferrous and manganous carbonates, graphite and only traces of magnesium.

Where long exposed the limestone has been dissolved out leaving a porous, brown to black decomposition product. This material makes the location of limestone deposits easy. The color is largely due to manganese dioxide because chlorine is given off when the rock is moistened with warm hydrochloric acid. On the shore, where washed by the waters of Bedford Basin, the color is nearly black. Large lumps of this material taken from the bed on the Quaintance property contain inside residual nodules of limestone. The surrounding decomposition product is banded.

Similar bands are observed in the quartzite surrounding the limestone nodules in the bed at G in Maxwell's quarry. The nodules lie in an almost continuous bed in quartzite between thin beds of slate. This mode of occurrence probably indicates concretionary origin. Before the granite intrusion part of the limestone was dissolved out. The surrounding decomposition material was banded, and these bands remained even after intense metamorphism by the granite intrusion. The appearance of a small fault, with a displacement of only a fraction of an inch, cutting both limestone and quartzite, shows that solution took place before metamorphism by the granite intrusion.

At several points water-worn pebbles are found sparingly in the quartzite near the limestone beds. One of these pebbles, a flat stone, was strongly bent without breaking. These pebbles are not segregated in heaps but occur separately. Therefore it is not probable that they were carried by water. We make the suggestion that these pebbles were dropped by ice in the period between the deposition of the Goldenville and Halifax sediments. A similar case of recent occurrence

was found at Clementsport, N. S. Some time ago samples of a glassy material, supposed to be obsidian, were sent to the late Prof. D. S. McIntosh. He asked us to find more material in this locality. We found it on the bank of Moose River in a slag heap of the old Cunard Iron Works. Pieces of this slag had been picked up by ice and transported up and down Annapolis Basin.

Through the courtesy of Messrs. A. E. Quaintance and Edward Maxwell I was able to procure valuable specimens and oata on their properties. The clinometer used was a much appreciated gift from Professor G. V. Douglas. Finally, I wish to acknowledge the help of Dr. H. S. King who supervised both the field work and the writing of this paper.